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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/724,897

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Yuan-Chi Chang

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MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC

8321 OLD COURTHOUSE ROAD

SUITE 200

VIENNA, VA 22182-3817

EXAMINER

PHAM, HUNG Q

ART UNIT

PAPER NUMBER

2168

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/724,897

Applicant(s)

CHANG ET AL.

Examiner

HUNG Q. PHAM

Art Unit

2168

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-19, 21-31 and 33-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-19, 21-31 and 33-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/16/2008 has been entered.

Response to Arguments

Applicant's arguments with respect to the rejection under 35 U.S.C. § 102 have been fully considered but they are not persuasive.

As argued by applicant (Pages 10 and 11):

Applicants again point out that it appears that the Examiner fails to recognize that, even if Bergman did demonstrate the identification of semantic objects, there is no suggestion to then summarize these semantic object and index the summary of attributes.

...

Bergman does not suggest also thereafter summarizing these semantic objects, let alone developing an index of such summaries.

...

Neither Figure 3(a) nor Figure 4(a) demonstrates an example of a semantic object, as the Examiner alleges, let alone demonstrating an example of a summary of a semantic object. Rather, these figures demonstrate the method that the user uses to define a query to search the database, as clearly described in the final sentence on page 452.

The examiner respectfully disagrees.

The PetroSPIRE system permits a user to define rock strata using image examples with parameter constraints (Page 449, Lines 5-6). The PetroSPIRE system is based on features such as textures or local color histograms are extracted from the raw data. Features can be further abstracted by segmenting the image and assigning a semantic label such as "shale" or "siltstone" to each contiguous region. Each semantic object so obtained is stored with boundary information and some associated attributes such as size and centroid (Page 454, Lines 3-15). As shown in FIG. 3 (a), *a semantic object* representing a strata type, i.e., "shale", is *received*. The *attributes of the semantic object* representing the strata type is *summarized* as shown in FIG. 4 (a), e.g., FMI texture looks like the images and Gamma Ray > 45. The *summary of attributes* such as textures and values are *indexed* as taught by Bergman at Page 457 Lines 43-44 and 50-51.

Applicant's arguments with respect to the Bergman reference in view of the Li reference have been fully considered but they are not persuasive. The combination of Bergman and Li teach and suggest each and every element of the claimed invention as detailed in the previous Office Action.

In light of the foregoing arguments, the 35 U.S.C. § 102/103 is continued as following.

Double Patenting

Applicant is advised that should claim 13 be found allowable, claim 1 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 26-31 and 33-37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 26-31 and 33-37 direct to a system comprising software per se. Software per se is not one of the four categories of invention and therefore claims 26-31 and 33-37 are not statutory. Software per se is not a series of steps or acts and thus is not a process. Software per se is not a physical article or object and as such is not a machine or manufacture. Software per se is not a combination of substances and therefore is not a composition of matter.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4, 6, 12, 17, 19, 31 and 38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the clause *said semantic object* at line 4 references to "semantic object" at line 1 and another "semantic object" at line 3. It is unclear what semantic object is being referenced.

Regarding claims 4 and 17, the clause *the index of the plurality of semantic object attributes* references to the other item in the claims. It is unclear what item is being referenced.

Regarding claims 6 and 12, the clause *the semantic object* references to the other item in the claims. It is unclear what item is being referenced.

Regarding claims 15 and 19, the clause *the semantic object* references to the other item in the claims. It is unclear what item is being referenced.

Regarding claims 27 and 31, the clause *the semantic object* references to the other item in the claims. It is unclear what item is being referenced.

Regarding claim 38, the clause *said semantic object* references to the other item in the claims. It is unclear what item is being referenced.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 8, 9, 12-19, 21, 22, 25-31, 33, 34, 37 and 38 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications] and Li et al. [Comparing Texture Feature Sets for Retrieving Core Images in Petroleum Application].

Regarding claims 1, 13, 14 and 26, Bergman teaches *a method for storing a semantic object* (Bergman, Abstract), the method comprising:

receiving a semantic object (As shown in FIG. 3 (a), *a semantic object* representing a strata type, i.e., "shale", is *received*);

summarizing attributes of said semantic object (As in FIG. 4(a) attributes such as FMI Texture and Gamma Ray of semantic object shale strata is summarized);

indexing the summary of attributes (Texture and the value are indexed (Bergman, Page 457 Lines 43-44 and 50-51)); and

storing the summary of attributes and the index of the summary of attributes (The data repository for SPIRE includes a relational database for storing derived features and semantic object (Bergman, Page 453 Lines 14-15)).

The missing of Bergman is *geological seismic survey data* for deriving semantic object.

Art Unit: 2168

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration, other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, *geological seismic survey data*, e.g., seismic data, is an inherited feature for generating texture features.

Regarding claim 1, 13, 14 and 26, Bergman teaches *a method for storing a semantic object* (see Abstract), the method comprising:

receiving a semantic object (As shown in FIG. 3 (a), *a semantic object* representing a strata type, i.e., "shale", is *received*);

summarizing attributes of said semantic object (As in FIG. 4(a) attributes such as FMI Texture and Gamma Ray of semantic object shale strata is summarized);

indexing the summary of attributes (Texture and the value are indexed (Bergman, Page 457 Lines 43-44 and 50-51)); and

storing the summary of attributes and the index of the summary of attributes (The data repository for SPIRE includes a relational database for storing derived features and semantic object (Bergman, Page 453 Lines 14-15)), *wherein said summary of attributes comprises one of a slice label, a signal strength, and a coordinate of a surveyed segment* (As in FIG. 4(a) the Gamma Ray as *a signal strength*).

The missing of Bergman is *geological seismic survey data* for deriving semantic object.

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration,

Art Unit: 2168

other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, obviously *geological seismic survey data*, e.g., seismic data, is used to generate texture features.

Regarding claims 2, 15, and 27, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the semantic object comprises a summary representation of raw data measurements* (Bergman, Page 454 Lines 11-12, indicating that features are extracted from raw data).

Regarding claims 3, 16, and 28, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses the step of *searching a database of a plurality of indexed attributes of semantic objects* (Bergman, Page 459 Lines 33 and 41, querying a database which includes an index of texture features).

Regarding claims 4, 17, and 29, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 26, Bergman further discloses the step of *searching the index of the plurality of semantic object attributes to identify a semantic object having attributes that match a query and retrieving the identified semantic object* (Bergman, Page 452 Lines 18-20, using a semantic definition to search the archive, and subsequently returning the results).

Regarding claims 5, 18, and 30, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 28, Bergman further discloses *an optimizing mechanism is used in searching to optimize the process of searching* (Bergman, Page 459 Lines 7-10,

indicating a dimensionality reduction algorithm that locally reduces the dimensionality of the search space. Lines 5-6 indicate that the search process can be extremely time-consuming if a linear scan is performed, hence, the dimensionality reduction algorithm is presented as a time-saving optimization to the search process).

Regarding claims 6, 19, and 31, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the semantic object represents a model of a phenomena of interest that is measured by a collection of data which exceeds a data size that is accessible with a predetermined efficiency by multiple simultaneous users* (Bergman, Page 449 Lines 27 and 35, indicating that the semantic objects represent phenomena related to petroleum well-bore data, and that the volume of this data is extremely large).

Regarding claim claims 8, 21, and 33, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the index of the summary of attributes comprises a plurality of key features that have been resolved into a set of data points and summary statistics* (Bergman, Page 457 Lines 50-51, where summary statistics is read on feature values, because both consist of values summarized from a semantic object).

Regarding claim claims 9, 22, and 34, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the summary of attributes comprises one of a confidence level, summary statistics and a compact approximation* (Bergman, Page 457 Lines 46-47, where summary statistics is read on vector of feature values, because both consist of values summarized from a semantic object).

Regarding claims 12, 25, and 37, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 9, 22 and 34, Bergman further discloses *the confidence level represents a degree of accuracy of classification for the semantic object* (Bergman, Page 458 Lines 12-14, indicating a similarity of zero or one between objects, zero indicating that the objects do not belong to the same class, one indicating that the objects do belong to the same class).

Regarding claim 38, Bergman teaches all of the claimed subject matter as discussed above with respect to claim 1, Bergman further discloses *the semantic object has been previously extracted* (As disclosed by Bergman at Page 457 Lines 27-29, the object definition can be used to pre-extract semantic object) and *comprises a channel* (Page 450, The Application Area).

The missing of Bergman is *geological seismic survey data* for extracting semantic object.

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration, other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, obviously *geological seismic survey data*, e.g., seismic data, can be used to generate texture features and used the texture features for extracting semantic object.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10, 11, 23, 24, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications] and Li et al. [Comparing Texture Feature Sets for Retrieving Core Images in Petroleum Application] in view of Yu et al. [A Framework for Mining Sequence Database at Multiple Abstraction Levels].

Regarding claims 10, 23, and 35, Bergman does not explicitly teach *the compact approximation comprises a multiple segment polyline*.

Yu teaches *the compact approximation comprises a multiple segment polyline* (Yu, Page 268 Col. 1 Lines 1-8, segmenting data, then finding a linear approximation to each segment. These line

segments comprise a polyline, since a polyline is simply a line comprised of one or more line segments (see Wikipedia definition of polyline included in this Office Action)).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modified the method of summarizing a semantic object taught by Bergman by the method of approximating data by a polyline taught by Yu, because approximating a semantic object by a polyline enables similarity searches, particularly to identify data with similar geological features (Yu, Page 267, Col. 1 Lines 6-11 and Col. 2 Lines 4-6).

Regarding claims 11, 24, and 36, Yu further discloses *each segment of the multiple segment polyline comprises a best fit line having end point coordinates and a slope* (Yu, Page 270 Col. 1 Lines 22-25, showing the segments have endpoints; Page 270 Col. 1 Lines 41-43, showing the segments have a slope).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q. PHAM whose telephone number is 571-272-4040. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TIM T. VO can be reached on 571-272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 2168

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG Q PHAM/
Primary Examiner
Art Unit 2168

July 12, 2008